tions to be lent to any public school in greater New York. There are two motor cars and a motor cycle to deliver slides and collections. Each messenger visits from twenty to forty schools a day. The American Museum is about to erect a special School Service building of five stories where from three to five thousand children daily may be taken care of properly. The blind are also provided for.

Of course, all this can not be done by the ordinary officers of the museum, and that is a fact which must be recognized in this country. The American Museum has its own department of education, with Mr. George H. Sherwood at the head. In the same way the Brooklyn Botanical Garden has its curator of elementary education, who contributes to the same issue of *Natural History* an interesting article on "Gardening and the City Child." But the work which starts in the museums and public gardens of New York and Brooklyn is taken up by other outside bodies, as the School Nature League of New York City, the president of which, Mrs. John I. Northrop, here tells us how in one of the elementary schools in the middle of the slums a wonderful nature-room has been installed. It is visited by from eight hundred to one thousand children every week. Here is a place for all those miscellaneous curiosities so frequently rejected by the staid museums. They can be placed in the hands of the children and many a fascinating lesson drawn from them. The love of nature thus begun is carried out into the open by means of summer camps, and so becomes linked up with the Boy Scout camps with their traveling museums.

Well, why is it that the Americans have got so far ahead of us on these lines? They have no doubt a new field to cultivate, and they do not have to contend against the terrible weight of inertia inevitable to some of our royal and ancient establishments. But to a large extent it is because Americans are not ashamed of having an ideal and of talking about it. They do not mind saying what they are going to do, and they make the utmost of everything that they have done. This is not the Englishman's way, but it is a way that interests the public both rich and poor. It brings money from the former and enthusiasm from the latter. If we want to achieve the same results we must not be above following somewhat similar methods. Here, during the summer holidays, are the children crowding our museums at South Kensington day after day. Can not something more be done for them, even if we shed a little dignity in the process?—*Nature.*

SCIENTIFIC BOOKS

The Coccidæ of Ceylon. By E. ERNEST GREEN. London: Dulau and Co., 1896-1922. Pp. xli plus 472; 209 plates.

Part I of "The Coccidæ of Ceylon" appeared in 1896, Part II in 1899, Part III in 1904, Part IV in 1909, and with the appearance of Part V there is completed a work that is worthy of a place among the classics of entomology.

The Coccidæ or scale insects are a group of almost unsurpassed economic importance. There is probably no horticulturist who is not familiar with at least a few of the species and whose pocketbook is not the lighter as a result of their activities. The cost of repressing them is a constant tax upon the horticultural industries everywhere, a part, in effect, of the overhead expense of producing horticultural products. And the ease with which they are transmitted from one part of the world to another has resulted in the practically cosmopolitan distribution of many of the most harmful species together with the frequent introduction into new regions of others.

So it is that the scale insects stand in need of the most careful systematic study. But the minute size of many of the species, the difficulty of obtaining adequate microscopic preparations, and the obscureness of the structures available for classification have always stood in the way of such study. Unfortunately these difficulties have been only too completely reflected in the quality of the systematic work that has been done upon the family. The systematic work upon this group is in general of by no means very satisfactory character and is in large part sadly deficient. Yet to this generalization "The Coccidæ of Ceylon" is a most

gratifying exception. It stands, indeed, at the very apex of all the work that has been done upon the Coccidæ.

It is not that "The Coccidæ of Ceylon" is entirely free from defects. The fact that its preparation has extended over more than a quarter of a century precludes this, for since it was begun there have been radical changes in our methods and in our standards as well. Yet throughout it has always stood fully abreast and even in advance of the best contemporaneous work. Above all, the student, turning to its pages, can identify with relative certainty the species with which he may be dealing. With this much rendered possible, criticisms of any other features are but secondary. It is a splendid work, beautifully illustrated, well arranged and well printed. To its author all entomologists, whether economic or not, who are interested in the scale insects are under an obligation that can but illy be repaid. For the work has been a labor of love, its author's recompense the pleasure in its accomplishment.

With technical criticisms, of which there are some, I am not here concerned. Nor is it necessary to deal with the scope of the work, for practically all entomologists are familiar with this from the earlier parts. It is my desire simply to call attention to the appearance of the final part and to congratulate the author upon the completion of a huge task well done. Its completion clinches his hold upon a position that has really long been his, that of the foremost student of the Coccidæ.

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SPECIAL ARTICLES

PHOTOPERIODISM OF WHEAT: A DETERMINING FACTOR IN ACCLIMATIZATION

GARNER and Allard (4), working with several species of plants, found that normally a plant could attain the flowering and fruiting stage only when the length of day was favorable, and suggest the terms *photoperiod* and *photoperiodism* to designate the favorable length of day and the response of a plant to the relative length of day and night. They conclude that, varying with species and variety, there is a critical photoperiod essential for the initiation of the fruiting stage of each plant, and that when this critical photoperiod does not occur the plant tends to remain vegetative.

In a preliminary experiment, the writer has found that a proper adjustment of the daily exposure to light, independently of temperature, will control the type of growth in the winter wheat plant and that by regulation of this factor it is possible to induce the jointing and the heading stages irrespective of season. In addition, this experiment has shown that there is a minimum stimulating photoperiod for the control of each of these stages of growth in the winter wheat plant, that for the succeeding stage not being the same as that for the preceding, and each photoperiod being, therefore, within certain limits critical for the stage concerned.

Although factors governing habits of growth, the distribution and the production of wheat have been the subject of many studies, the literature available has not revealed that any have ever considered, beyond the generalizations of Garner and Allard, the factors of photoperiodism as having a deciding influence. Circumstantial evidence, however, is available, which on analysis clearly indicates that these factors are important both with winter and with spring wheats. Grantham (5), Jardine (6) and Seivers and Holtz (11) have shown the tendency of winter wheat to a vegetative type of fall growth and have emphasized that the amount of this growth is dependent on time of seeding and available fertility. Gaines (10) and Neilson-Ehle (7) have found, in certain localities of the north temperate zone, the winter character to be inheritable as a simple Mendelian major. The northern limits of the winter wheat belt in the United States bear a significant relation to the northern limits of an active growing season of 150 days (1, 2). Smith, Root and Blair (3, 8, 12, 13, 14), in statistical studies of data from Ohio, found the dominant weather factor for winter wheat difficult to determine, but all agreed that the month of March was the critical period during which the effects of snowfall and temperature were later most reflected in condition and finally